

**L7(6.3) - Vertex Form by Completing the Square**

Recall:

Vertex form:  $y = a(x - h)^2 + k$

Note that  $(x - h)^2$  is a perfect square.In general, for perfect square trinomials,

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

Apr 12-2:42 PM

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Identify the missing constant so that the trinomial is a perfect square trinomial, then factor it.

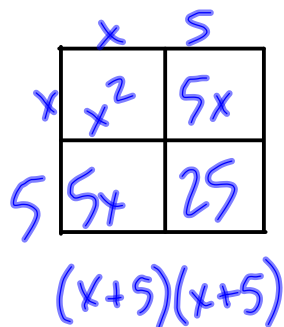
$x^2 + 6x + \underline{9} = (x + \underline{3})^2$

$x^2 - 4x + \underline{4} = (x - \underline{2})^2$

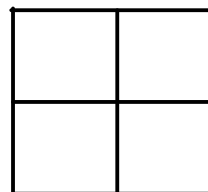
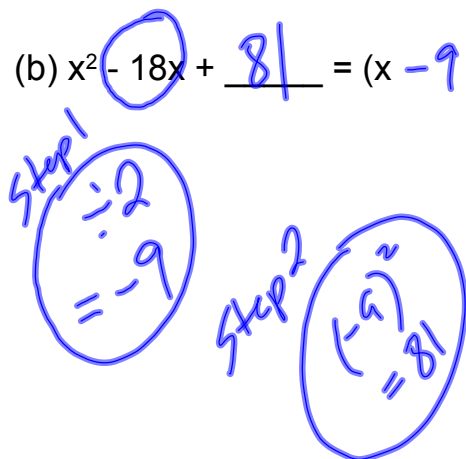
Mar 25-8:02 AM

Ex.1 What is missing from these perfect squares?

(a)  $x^2 + 10x + \underline{25} = (x + 5)^2$



(b)  $x^2 - 18x + \underline{81} = (x - 9)^2$



Nov 23-8:41 PM

Identify the missing constant so that the trinomial is a perfect square trinomial. You will have some tiles "left over".

$x^2 + 6x + 3 = (x+3)^2 - 9 + 3$

$x^2 + 6x + 9 - 9 + 3$

$y = (x+3)^2 - 6$

$= x^2 + 6x + 3$

$= x^2 + 6x + 9 - 9 + 3$

$= (x+3)^2 - 9 + 3$

$= (x+3)^2 - 6$

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Identify the missing constant so that the trinomial is a perfect square trinomial. You will have some tiles "left over".

$x^2 - 4x - 3 = ( \quad )^2 \underline{\hspace{2cm}}$

$$= x^2 - 4x + 4 - 4 - 3$$

↓

$$= (x-2)^2 - 4 - 3$$

$$= (x-2)^2 - 7$$

Vertex  $(2, -7)$   
 $(x-2)(x-2)$

Mar 25-8:02 AM

Steps:

- 1) Factor out 'a' from the first two terms.
- 2) Force a perfect square for the factored first two terms.
- 3) Collect the constants.

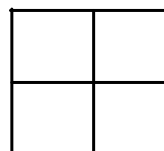
Ex.2 Complete the square for each of the following

a)  $y = x^2 + 12x - 7$

$$= x^2 + 12x + 36 - 36 - 7$$

$$= (x+6)^2 - 36 - 7$$

$$= (x+6)^2 - 43$$



May 3-7:51 PM

b)  $y = x^2 - 20x + 15$

$$= (x-10)^2 - 85$$

$$= x^2 - 20x + 100 - 100 + 15$$

$$= (x-10)^2 - 85$$

c)  $y = 3x^2 + 12x + 11$

extra step 1st:

$$= 3[x^2 + 4x] + 11$$

$$= 3[x^2 + 4x + 4 - 4] + 11$$

$$= 3[(x+2)^2 - 4] + 11$$

$$= 3(x+2)^2 - 12 + 11$$

$$= 3(x+2)^2 - 1$$

Nov 23-9:00 PM

d)  $y = -x^2 + 6x + 13$

$$= -1(x^2 - 6x) + 13$$

$$= -1(x^2 - 6x + 9 - 9) + 13$$

$$= -1[(x-3)^2 - 9] + 13$$

$$= -(x-3)^2 + 9 + 13$$

$$= -(x-3)^2 + 22$$

Assigned Work:

p. 331 # 2ab, 3ab, 5ac,  
7ab, 9, 11, 16

Nov 23-9:00 PM